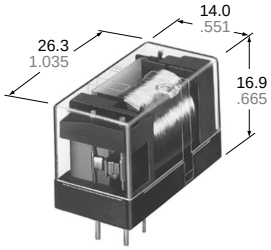
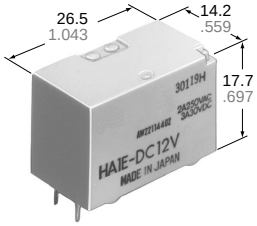
NAiS

# COST SAVING SUBMINIATURE PC BOARD RELAYS

# HA-RELAYS




HAE Amber Relays

mm inch

## FEATURES

- **Compact construction**
- **Sensitive - very low operating power**
- **Soldering flux inflow prevented by molded construction**
- **Contact capacity - 3 A 250 V AC, 30 V DC**
- **Simple mechanism for stable quality - only 9 pieceparts**
- **Amber sealed types available**

## SPECIFICATIONS

### HA1 Standard type

#### Contacts

| | | | |
|---|---|---|---|
| Arrangement | | | 1 Form C |
| Contact material | | | Silver-nickel |
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) | | | 50 mΩ |
| Rating (resistive load) | Max. switching power | | 750 VA, 90 W |
| | Max. switching voltage | | 250 V AC, 30 V DC |
| | Max. switching current | | 3 A |
| Expected life (min. operations) | Mechanical | | $10^7$ |
| | Electrical (resistive) | 3 A 250 V AC | $10^5$ |
| | | 3 A 30 V DC | $5\times10^5$ |

#### Coil

| | |
|---|---|
| Minimum operating power | (AC) 0.58 VA, (DC) 230 mW |
| Nominal operating power | (AC) 0.9 VA, (DC) 360 mW |

#### Characteristics

| | | | |
|---|---|---|---|
| Maximum operating speed | | | 20 cpm |
| Initial insulation resistance*1 (at 25°C, 50% R.H.) | | | Min. 100 MΩ at 500 V DC |
| Initial breakdown voltage*2 | Between open contacts | | 750 Vrms for 1 min. |
| | Between contacts and coil | | 1,500 Vrms for 1 min. |
| Operate time*3 (at nominal voltage) (at 20°C) | | | Approx. 6 ms (AC), Approx. 5 ms (DC) |
| Release time (without diode)*3 (at nominal voltage)(at 20°C) | | | Approx. 6 ms (AC), Approx. 3 ms (DC) |
| Temperature rise (at 20°C) | | | Max. (AC) 60°C, (DC) 40°C with nominal coil voltage and at 3A switching current |
| Shock resistance | | Functional | 98 m/s² {10G} |
| | | Destructive | 980 m/s² {100G} |
| Vibration resistance | | Functional | 10 to 55Hz at double amplitude of 1mm |
| | | Destructive | 10 to 55Hz at switching of 2mm |
| Conditions for operation, transport and storage*4 (Not freezing and condensing at low temperature) | | Ambient temp. | –40°C to +50°C –40°F to +122°F |
| | | Humidity | 5 to 85%R.H. |
| Unit weight | | | Approx. 15 g .53 oz |

### HA1E Amber sealed type

#### Contacts

| | | | |
|---|---|---|---|
| Arrangement | | | 1 Form C |
| Contact material | | | Gold-clad over silver-nickel |
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) | | | 50 mΩ |
| Rating (resistive load) | Max. switching power | | 500 VA, 90 W |
| | Max. switching voltage | | 250 V AC, 30 V DC |
| | Max. switching current | | 2 A AC, 3A DC |
| Expected life (min. operations) | Mechanical | | $10^7$ |
| | Electrical (resistive) | 2 A 250 V AC | $10^5$ |
| | | 3 A 30 V DC | $2\times10^5$ |

#### Coil

| | |
|---|---|
| Minimum operating power | (AC) 0.58 VA, (DC) 230 mW |
| Nominal operating power | (AC) 0.9 VA, (DC) 360 mW |

#### Characteristics

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| Maximum operating speed | | | 20 cpm |
| Initial insulation resistance*1 (at 25°C, 50% R.H.) | | | Min. 100 MΩ at 500 V DC |
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| | Between contacts and coil | | 1,500 Vrms for 1 min. |
| Operate time*3 (at nominal voltage) (at 20°C) | | | Approx. 6 ms (AC), Approx. 5 ms (DC) |
| Release time (without diode)*3 (at nominal voltage)(at 20°C) | | | Approx. 6 ms (AC), Approx. 3 ms (DC) |
| Temperature rise (at 50°C) | | | Max. (AC) 60°C, (DC) 40°C with nominal coil voltage and at 3A switching current |
| Shock resistance | | Functional | 98 m/s² {10G} |
| | | Destructive | 980 m/s² {100G} |
| Vibration resistance | | Functional | 10 to 55Hz at double amplitude of 1mm |
| | | Destructive | 10 to 55Hz at double amplitude of 2mm |
| Conditions for operation, transport and storage*4 (Not freezing and condensing at low temperature) | | Ambient temp. | –40°C to +50°C –40°F to +122°F |
| | | Humidity | 5 to 85%R.H. |
| Unit weight | | | Approx. 15 g.53 oz |

**Remarks**

* Specifications will vary with foreign standards certification ratings.
*1 Measurement at same location as "Intial breakdown voltage" section
*2 Detection current: 10 mA
*3 Excluding contact bounce time
*4 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61).

## TYPICAL APPLICATIONS

Office machines, electrical home appliances, load management equipment.

## ORDERING INFORMATION

Ex. HA 1 E — DC6V

| Contact arrangement | Type classification | Coil voltage |
|---|---|---|
| 1: 1 Form C | Nil: Dust cover type<br>E: Amber sealed type | DC 5, 6, 9, 12, 24 V<br>AC 6, 12, 24, 48, 115V |

Notes: 1. For UL/CSA recognized types, add suffix UL/CSA.
2. Standard packing Carton: 100 pcs., Case: 500 pcs. or 2,000 pcs.

## TYPES AND COIL DATA (at 20°C 68°F)

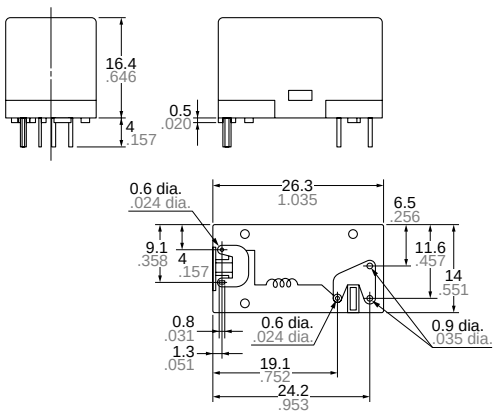
| Part No. | Nominal voltage | Pick-up voltage, (max.) | Drop-out voltage, (min.) | * Nominal operating current, mA | Nominal operating power | Coil resistance, Ω (±10%) | Maximum allowable voltage |
|---|---|---|---|---|---|---|---|
| HA1-AC6V<br>HA1E-AC6V | 6 V AC | 4.8 V AC | 1.2 V AC | 150 | 0.9 VA | — | 6.6 V AC |
| HA1-AC12V<br>HA1E-AC12V | 12 V AC | 9.6 V AC | 2.4 V AC | 76 | 0.9 VA | — | 13.2 V AC |
| HA1-AC24V<br>HA1E-AC24V | 24 V AC | 19.2 V AC | 4.8 V AC | 37 | 0.9 VA | — | 26.4 V AC |
| HA1-AC48V<br>HA1E-AC48V | 48 V AC | 38.4 V AC | 9.6 V AC | 19 | 0.9 VA | — | 52.8 V AC |
| HA1-AC115V<br>HA1E-AC115V | 115 V AC | 92.0 V AC | 23.0 V AC | 8 | 0.9 VA | — | 126.5 V AC |
| HA1-DC5V<br>HA1E-DC5V | 5 V DC | 4.0 V DC | 0.5 V DC | 72 | 360 mW | 69 | 6.0 V DC |
| HA1-DC6V<br>HA1E-DC6V | 6 V DC | 4.8 V DC | 0.6 V DC | 60 | 360 mW | 100 | 7.2 V DC |
| HA1-DC9V<br>HA1E-DC9V | 9 V DC | 7.2 V DC | 0.9 V DC | 40 | 360 mW | 225 | 10.8 V DC |
| HA1-DC12V<br>HA1E-DC12V | 12 V DC | 9.6 V DC | 1.2 V DC | 30 | 360 mW | 400 | 14.4 V DC |
| HA1-DC24V<br>HA1E-DC24V | 24 V DC | 19.2 V DC | 2.4 V DC | 15 | 360 mW | 1,600 | 28.8 V DC |

Note: The range of coil current — AC type: ±15% at 60 Hz, DC type: ±10% at 20°C 68°F coil temperature.

## DIMENSIONS

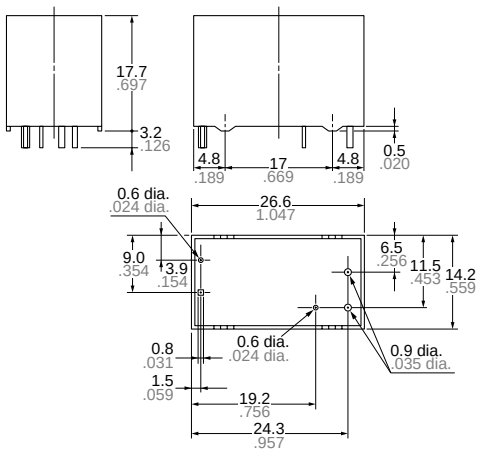
mm inch

HA1




General tolerance: ±0.5 ±.020

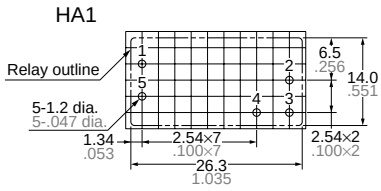
HA1E



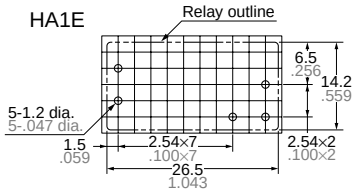

General tolerance: ±0.5 ±.004

PC board pattern (Copper-side view)

HA1

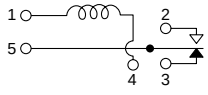



HA1E




Tolerance: ±0.1 ±.004

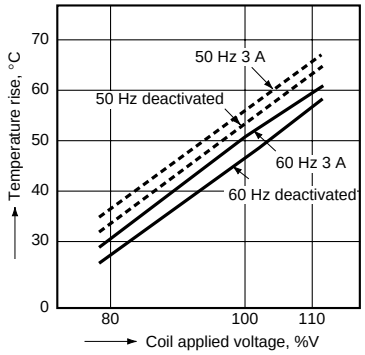
Schematic (Bottom view)



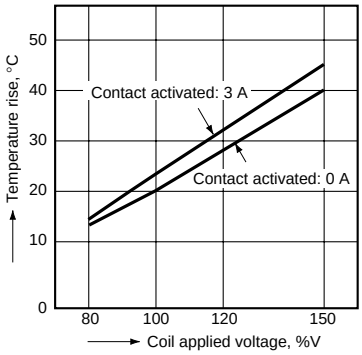
# REFERENCE DATA

1.-(1) Coil temperature rise (AC PC board type)

Point measured: Inside the coil

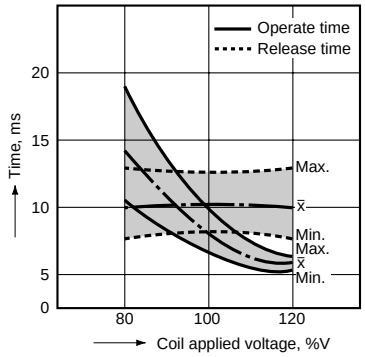



1.-(2) Coil temperature rise (DC PC board type)

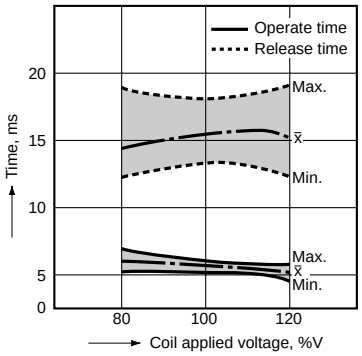



Operate and release time

Sample: HA1-DC12V




Sample: HA1-AC115V




## For Cautions for Use, see Relay Technical Information (Page 48 to 76).



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